

WHAT IS CLAIMED IS:

1. A method of being approved data transmission from a UTRAN (UMTS Terrestrial Radio Access Network) at a UE (User Equipment) within a coverage area of the UTRAN in a TDD (Time Division Duplexing) CDMA (Code Division Multiple Access) mobile telecommunication system where a frame has a plurality of sub-frames, each sub-frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

10 selecting one of a plurality of sync codes by which the UTRAN identifies UEs that request data transmission and transmitting information about the selected sync code in a time slot of a sub-frame to the UTRAN;

receiving the sync code information, information about an arrival time of the sync code, time update information indicating a variation in a transmission time of data, and power control information indicating an adjustment to a power gain in the UE from the UTRAN on an FPACH (Fast Physical Access Channel);
15 and

transmitting the RACH data on a P-RACH (Physical Random Access Channel) mapped from the FPACH according to the time update information and
20 the power control information.

2. The method of claim 1, wherein if the sync code information indicates the selected sync code, the UE receives the sync code information and the sync code arrival time information on the FPACH.

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3. The method of claim 1, further comprising the step of monitoring as many sub-frames as a quotient of the number of the sync codes divided by the number of FPACHs per sub-frame, for the FPACH, after transmission of the sync code.

4. A method of approving data transmission to a UE (User Equipments) within a coverage area of a UTRAN (UMTS Terrestrial Radio Access Network) at the UTRAN in a TDD (Time Division Duplexing) CDMA
 5 (Code Division Multiple Access) mobile telecommunication system where a frame has a plurality of sub-frames, each sub-frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

receiving a plurality of sync codes by which the UTRAN identifies UEs
 10 that request data transmission in the time slots of sub-frames;

detecting a reception time delay from an arrival time of each sub-frame including a sync code and a predetermined reception time slot in the sub-frame, measuring a reception power of each sync code, and transmitting information including the sync code, the arrival time of each sub-frame with a sync code, the
 15 time delay, and the power measurements on an FAPCH (Fast Physical Access Channel); and

receiving data from the UEs on a P-RACH (Physical Random Access Channel) mapped from the FPACH according to the time information and the power control information.
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5.. The method of claim 4, wherein the UTRAN transmits the information on FPACHs within as many sub-frames as a quotient of the number of the sync codes divided by the number of FPACHs per sub-frame after receipt of the sync codes.

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6. A method of being approved data transmission from a UTRAN (UMTS Terrestrial Radio Access Network) at a UE (User Equipment) within a coverage area of the UTRAN in a TDD (Time Division Duplexing) CDMA (Code Division Multiple Access) mobile telecommunication system where a

frame has a plurality of sub-frames, each sub-frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

- selecting one of a plurality of sync codes by which the UTRAN identifies
- 5 UEs that request data transmission in the UE and transmitting information about the selected sync code in a time slot of a sub-frame to the UTRAN;
- receiving information including the sync code in the time slot, detecting a reception time delay from an arrival time of a sub-frame including the sync code and a predetermined reception time slot in the sub-frame, measuring a
- 10 transmission power of each sync code, and transmitting information including the sync code, the arrival time of each sub-frame with a sync code, the time delay, and the power measurements to the UE on an FAPCH (Fast Physical Access Channel) in the UTRAN; and
- receiving the sync code information, information about the arrival time
- 15 of the sync code, time update information indicating a variation in the transmission time of data, and power information indicating an adjustment to a power gain in the UE from the UTRAN on an FPACH (Fast Physical Access Channel), and transmitting the data on a P-RACH (Physical Random Access Channel) mapped from the FPACH to the UTRAN according to the time update
- 20 information and the power information in the UE.

7. The method of claim 6, wherein the UTRAN transmits the information to the UE on the FPACH within as many sub-frames as a quotient of the number of the sync codes divided by the number of FPACHs per sub-frame

25 after receipt of the sync code.

8. A method of being approved data transmission from a UTRAN (UMTS Terrestrial Radio Access Network) at a UE (User Equipment) within a coverage area of the UTRAN in a TDD (Time Division Duplexing) CDMA

(Code Division Multiple Access) mobile telecommunication system where a frame has a plurality of sub-frames, each sub-frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

- 5 selecting one of a plurality of sync codes by which the UTRAN identifies UEs that request data transmission and transmitting information about the selected sync code in a time slot of a sub-frame to the UTRAN;

 receiving information indicating a sub-frame with an FPACH (Fast Physical Access Channel) that acknowledges the sent sync code on an I_FPACH

- 10 (Index Fast Physical Access Channel) from the UTRAN;

 receiving time update information and power control information on the FPACH indicated by the I_FPACH; and

- transmitting data on a P-RACH (Physical Random Access Channel) mapped from the FPACH according to the time update information and the
15 power information.

9. The method of claim 8, wherein the I_FPACH information includes an index of the sent sync code and the arrival time of the sync code.

- 20 10. The method of claim 9, wherein the sub-frame with the FPACH is received one sub-frame after the I_FPACH.

11. The method of claim 9, wherein the length of the sync code index field is calculated by

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$$l_{index} = \left\lceil \log_2 N \right\rceil$$

where N is the number of sync codes.

12. The method of claim 9, wherein the length of the arrival time field is calculated by

$$l_{time} = \left\lceil \log_2 M \right\rceil$$

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where M is the maximum number of sub-frames to be monitored for the I_FPACH.

10 13. A method of approving RACH (Random Access Channel) data transmission to a UE (User Equipment) within a coverage area of a UTRAN (UMTS Terrestrial Radio Access Network) at the UTRAN in a TDD (Time Division Duplexing) CDMA (Code Division Multiple Access) mobile telecommunication system where a frame has a plurality of sub-frames, each sub-
15 frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

receiving one of a plurality of sync codes by which the UTRAN identifies UEs that request data transmission in a time slot of a sub-frame;

transmitting information indicating a sub-frame with an FPACH (Fast
20 Physical Access Channel) that acknowledges the received sync code to the UE on an I_FPACH (Index Fast Physical Access Channel);

transmitting time update information and power control information on the FPACH indicated by the I_FPACH; and

receiving RACH transmission data from the UE on a P-RACH (Physical
25 Random Access Channel) mapped from the FPACH at a time adjusted according to the time update information and with power controlled according to the power information.

14. The method of claim 13, wherein the UTRAN transmits

acknowledgements for a plurality of sync codes on the I_FPACH.

15. The method of claim 14, wherein the I_FPACH transmits acknowledgments for eight sync codes.

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16. The method of claim 14, wherein if the number of sync codes that the UTRAN acknowledges is less than the number of P-RACHs, the acknowledgment for a sync code is repeated in the I_FPACH signal.

10 17. The method of claim 16, wherein acknowledgment repetition times common to the sync codes is determined by

$$R_1 = \left\lfloor \frac{N}{A} \right\rfloor$$

15 and the number of acknowledgements to be repeated one more time is calculated by

$$R_2 = \left\{ \frac{N}{A} - \left\lfloor \frac{N}{A} \right\rfloor \right\} \times A$$

20 where N is the number of sync codes and A is the number of sync codes acknowledged in one sub-frame.

18. The method of claim 13, wherein if two sync codes are acknowledged on one FPACH, the number of FPACHs included in one sub-frame
25 is calculated by

$$n_FPACH (= \text{number of FPACH}) = \left\lceil \frac{L}{2} \right\rceil$$

where L is the number of P-RACHs assigned to one sub-frame and $\lceil x \rceil$ is a maximum integer equal to or less than x .

19. The method of claim 13, wherein if three sync codes are
5 acknowledged on one FPACH, the number of FPACHs included in one sub-frame is calculated by

$$n_FPACH (= \text{number of FPACH}) = \left\lceil \frac{L}{3} \right\rceil$$

- 10 where L is the number of P-RACHs assigned to one sub-frame and $\lceil x \rceil$ is a maximum integer equal to or less than x .

20. A method of approving RACH (Random Access Channel) data transmission in a TDD (Time Division Duplexing) CDMA (Code Division
15 Multiple Access) mobile telecommunication system where a frame has a plurality of sub-frames, each sub-frame has a plurality of time slots, and each time slot has a plurality of channels identified by codes, the method comprising the steps of:

- selecting one of a plurality of sync codes by which a UTRAN (UMTS
20 Terrestrial Radio Access network) identifies UEs (User Equipments) that request data transmission and transmitting the selected sync code in a time slot of a sub-frame by a UE;

- receiving information including the sync code from the UE, transmitting information indicating a sub-frame with an FPACH (Fast Physical Access
25 Channel) that acknowledges the sync code to the UE on an I_FPACH (Index Fast Physical Access Channel), and transmitting an acknowledgment including time update information and power control information to the UE on the FPACH by the UTRAN; and

receiving the I_FPACH frame and the FPACH frame from the UTRAN and transmitting RACH data on the P-RACH to the UTRAN according to the time update information and the power control information by the UE.

For more information